PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-245036
(43)Date of publication of application : 07.09.2001

(51)Int.Cl. H04M 1/23
B29C 45/26
B29C 45/56
H01H 11/00
H01H 13/14
// B29L 31:34

(21)Application number : 2000-050136
(22)Date of filing : 25.02.2000

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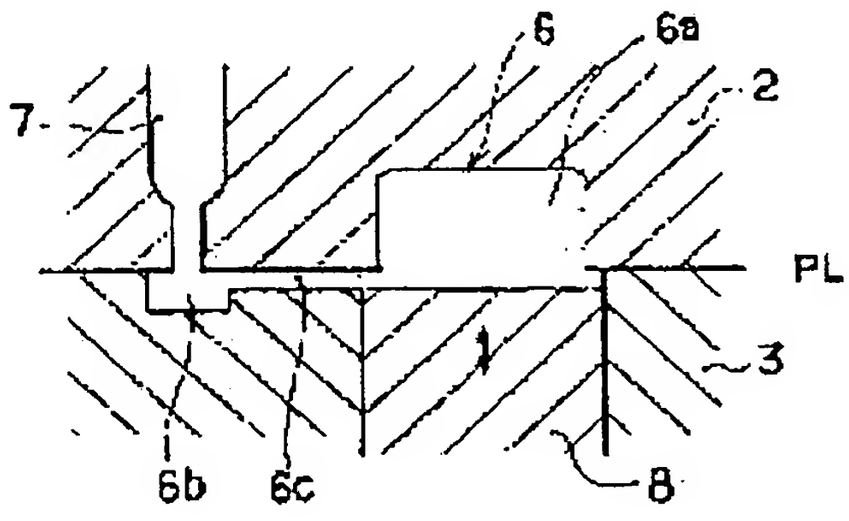
(54) RESIN MOLDING PUSH BUTTON UNIT FOR PORTABLE TERMINAL AND ITS MOLDING METHOD AND METALLIC MOLD

(57)Abstract:
PROBLEM TO BE SOLVED: To unnecessitate a rubber sheet owing to keeping an integral form while insuring moving quantity necessary to the switch operation of a push button part, to reduce the number of parts and processes, to make cost reduction, also to easily make injection resin density uniform, also to obtain prescribed resin density and to improve a non-defective rate as for a resin molding push button for a portable terminal, its molding method and a metallic mold.
SOLUTION: Each push button part 6a in the cavity 6 of the metallic mold is connected to a connecting part 6b or a stretching part by a thin connecting part 6c extending so as to encircle a part of surroundings of the button 6a only at one portion. The part 6c to be a resin injection inlet to the part 6a is made larger than a normal injection inlet, and resin density is adjusted to be prescribed resin density by moving a slide core 8 after resin injection.



LEGAL STATUS

[Date of request for examination] 28.02.2000
[Date of sending the examiner's decision of rejection] 12.11.2002
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number]
[Date of registration]
[Number of appeal against examiner's decision of rejection]
[Date of requesting appeal against examiner's decision of rejection]

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[Claim(s)]

[Claim 1] It is the resin shaping push button unit for personal digital assistants in which two or more push buttons are prepared together with a longitudinal direction and a lengthwise direction. There is the connection section of the shape of a frame arranged so that the outermost periphery of two or more push buttons may be surrounded. Said each push button it straddles between said connection section or the connection section which carries out phase opposite -- continuing -- the section -- these some push buttons -- be connected in one by the one closing-in connector section extended so that the surroundings may be surrounded -- the resin shaping push button unit for personal digital assistants characterized by being used said connection section and while it continued and the section had been connected.

[Claim 2] It is the shaping approach of the resin shaping push button unit for personal digital assistants that two or more push buttons are prepared together with a longitudinal direction and a lengthwise direction. In metal mold Two or more push button sections, The connection section of the shape of a frame which is arranged so that those outermost peripheries may be surrounded, and connects each push button, While the cavity for fabricating the resin mold goods of one which consist said each push button of the closing-in connector section of this push button over between said connection section or the connection section which carries out phase opposite which it continues and is connected with the section, and which was prepared so that the surroundings might be surrounded in part is prepared This a part of cavity is attended and a slide core is prepared. To the cavity in said metal mold Melting resin is poured in by the consistency lower than a Sadashige Tokoro fat consistency through a larger inlet than the usual diameter of a resin inlet. The shaping approach of the resin shaping push button unit for personal digital assistants characterized by making it move so that said resin consistency may go up said slide core to a Sadashige Tokoro fat consistency after the above-mentioned resin impregnation, and adjusting a resin

consistency.

[Claim 3] It is the metal mold for fabricating the resin shaping push button unit for personal digital assistants in which two or more push buttons are prepared together with a longitudinal direction and a lengthwise direction. In metal mold Two or more push button sections, The connection section of the shape of a frame which is arranged so that those outermost peripheries may be surrounded, and connects each push button, While the cavity for fabricating the resin mold goods of one which consist said each push button of the closing-in connector section of this push button over between said connection section or the connection section which carries out phase opposite which it continues and is connected with the section, and which was prepared so that the surroundings might be surrounded in part is prepared The slide core which attends this a part of cavity and is moved by the external driving source is prepared. Metal mold for fabricating the resin shaping push button unit for personal digital assistants characterized by preparing the larger inlet than the usual diameter of a resin inlet for injecting melting resin into said cavity.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the resin shaping push button unit, its shaping approach, and metal mold for personal digital assistants, such as a portable telephone.

[0002]

[Description of the Prior Art] From the former, two or more push buttons are prepared together with a longitudinal direction and a lengthwise direction, and resin shaping of the resin shaping push button for portable telephones is carried out in one as a unit. With reference to drawing 5 which expanded and showed drawing 4 and its part about this resin shaping metal mold, it explains below. Metal mold 101 is equipped with a punch 2, female mold 3 and 4, the spacer block 12, the base 13, the ejector plates 14 and 15 for performing ejection of the mold goods after shaping, and ejector pin 17 grade, and from a runner 7, in the direction of an arrow head, injects them into the cavity 6 for fabricating the resin mold goods prepared between a punch 2 and female mold 3 as it is also at a predetermined pressure about melting resin.

[0003] The cavity 6 for forming one set of the push button unit for portable telephones Two or more push button section 6a and connection section 6b of the shape of a frame which is arranged so that those outermost peripheries may be surrounded, and connects each push button section 6a, Each push button section 6a

is consisted of connection section 6b or two or more connector section 6c' over between the connection sections which carry out phase opposite which it continues and are connected with the section, impregnation of the melting resin to each push button section 6a is performed through connector section 6c', and this connector section 6c' is equivalent to a resin inlet.

[0004]

[Problem(s) to be Solved by the Invention] By the way, since the push button unit for portable telephones has the small whole configuration, above-mentioned connector section 6c' will usually become thin relatively, and the flow of resin will tend to worsen. Then, although it ties while making the pressure of impregnation resin high, and the die length of section 6c' is shortened and he is trying for the flow of resin not to worsen as much as possible, the poured-in resin consistency tends to become an ununiformity, and a predetermined resin consistency is not obtained, but it may serve as a defective, and there was a limitation also in improvement in the yield.

[0005] Moreover, the problem on the configuration of the push button unit for portable telephones fabricated using the conventional metal mold which was mentioned above is explained below. The conventional push button unit is shown in drawing 6 . This unit 31 consists of two or more push button sections 32, the connection section 33 of the shape of a frame which is arranged so that those outermost peripheries may be surrounded, and connects each push button section 32, and the connector sections 35 and 37 over between the connection section 33 or the connection section which carries out phase opposite for each push button section 32 that it continues and are connected with the section 34. The connector sections 35 and 37 are short in comparison, and since they are the gestalten held by two places which moreover left each push button section 32, there are few amounts required for switching of elastic bending (movable). Therefore, he was trying for each push button section 32 to secure a movable amount required for switching moreover after shaping of a push button unit, without becoming scattering because the rear-face side of each push button section 32 pastes up on a rubber sheet at the same time it is cut from the connection section 33 or the connector sections 35 and 37. In addition, the completed push button unit is included in a case so that a rubber sheet base side may counter the switch inside a portable telephone.

[0006] In the above conventional push button units, in order to secure the movable amount of each push button section 32, in order to really maintain a gestalt, the rubber sheet was needed, the cut process and the adhesion process were required,

components mark and a process increased, and it had become cost quantity.

[0007] It is made in order to solve the trouble mentioned above, in order to really maintain a gestalt, securing a movable amount required for switching of the push button section, a rubber sheet becomes unnecessary, reduction of components mark and processes is possible, and this invention aims at offering the resin shaping push button unit for personal digital assistants which can attain low cost-ization. Furthermore, an impregnation resin consistency can be easily made into homogeneity, and it can consider as a predetermined resin consistency, the rate of an excellent article increases, and this invention aims at offering the shaping approach of the resin shaping push button unit for personal digital assistants which can aim at improvement in the yield, and metal mold.

[0008]

[The means for solving a technical problem and an effect of the invention] In order to attain the above-mentioned purpose invention according to claim 1 It is the resin shaping push button unit for personal digital assistants in which two or more push buttons are prepared together with a longitudinal direction and a lengthwise direction. There is the connection section of the shape of a frame arranged so that the outermost periphery of two or more push buttons may be surrounded. Said each push button it straddles between said connection section or the connection section which carries out phase opposite -- continuing -- the section -- these some push buttons -- be connected in one by the one closing-in connector section extended so that the surroundings may be surrounded -- it is used, said connection section and while it continued and the section had been connected.

[0009] the configuration of above-mentioned this invention -- setting -- each push button -- the connection section -- or -- continuing -- the section -- some push buttons -- since it is tied only by one place by the closing-in connector section extended so that the surroundings may be surrounded, compared with the conventional configuration, a movable amount is large, therefore without continuing and cutting the section, the connection section and while it had been tied, it can be used, and a rubber sheet is less necessary like before For this reason, a cut process and an adhesion process become unnecessary, reduction of components mark and processes can be performed, and low cost-ization can be attained.

[0010] Moreover, invention according to claim 2 is the shaping approach of the resin shaping push button unit for personal digital assistants that two or more push buttons are prepared together with a longitudinal direction and a lengthwise direction, in metal

mold, two or more push button sections, The connection section of the shape of a frame which is arranged so that those outermost peripheries may be surrounded, and connects each push button, While the cavity for fabricating the resin mold goods of one which consist said each push button of the closing-in connector section of this push button over between said connection section or the connection section which carries out phase opposite which it continues and is connected with the section, and which was prepared so that the surroundings might be surrounded in part is prepared This a part of cavity is attended and a slide core is prepared. To the cavity in said metal mold Melting resin is poured in by the consistency lower than a Sadashige Tokoro fat consistency through a larger inlet than the usual diameter of a resin inlet, after the above-mentioned resin impregnation, it is made to move so that said resin consistency may go up said slide core to a Sadashige Tokoro fat consistency, and a resin consistency is adjusted.

[0011] In the approach of above-mentioned this invention, melting resin is injected into the cavity in metal mold by the consistency lower than a Sadashige Tokoro fat consistency through a larger inlet than the usual diameter of a resin inlet, and after resin impregnation, by moving a slide core, a resin consistency is adjusted so that a resin consistency may turn into a Sadashige Tokoro fat consistency. In this way, since resin impregnation is performed, an impregnation resin consistency is easily made into homogeneity, moreover, it can consider as a predetermined resin consistency, the rate of an excellent article increases, and the yield improves.

[0012] Invention according to claim 3 is the metal mold for fabricating the resin shaping push button unit for personal digital assistants in which two or more push buttons are prepared together with a longitudinal direction and a lengthwise direction. In metal mold Moreover, two or more push button sections, The connection section of the shape of a frame which is arranged so that those outermost peripheries may be surrounded, and connects each push button, While the cavity for fabricating the resin mold goods of one which consist said each push button of the closing-in connector section of this push button over between said connection section or the connection section which carries out phase opposite which it continues and is connected with the section, and which was prepared so that the surroundings might be surrounded in part is prepared The slide core which attends this a part of cavity and is moved by the external driving source is prepared, and the larger inlet than the usual diameter of a resin inlet for injecting melting resin into said cavity is prepared.

[0013] In the metal mold of above-mentioned this invention, melting resin is injected

into a cavity through a larger inlet than the usual diameter of a resin inlet, and it adjusts so that a resin consistency may turn into a Sadashige Tokoro fat consistency by moving a slide core after resin impregnation and within the metal mold closing time. Thus, since what is necessary is just to carry out resin impregnation, an impregnation resin consistency is made into homogeneity, and it can perform considering as a predetermined resin consistency moreover easily, as a result the rate of an excellent article increases, and the yield improves.

[0014]

[Embodiment of the Invention] The metal mold hereafter used for shaping of the resin shaping push button unit for personal digital assistants concerning 1 operation gestalt of this invention, its shaping approach, and a resin shaping push button unit are explained with reference to a drawing. Drawing 1 shows the metal mold for fabricating the resin shaping push button unit for portable telephones, drawing 2 expands and shows the part, and drawing 3 shows the fabricated push button unit. Metal mold 1 is equipped with a punch 2, female mold 3, 4, and 5, the spacer block 12, the base 13, the ejector plates 14 and 15 for performing ejection of the mold goods after shaping, and the ejector bar 16 and ejector pin 17 grade, and melting resin is injected into the cavity 6 for fabricating the resin mold goods prepared in the party line PL side of a punch 2 and female mold 3 in the direction of an arrow head from a runner 7.

[0015] Moreover, while the movable slide core 8 is held to female mold 3 at female mold 5, it is prepared so that female mold 3 may be penetrated and an apical surface may attend a part the base side of a cavity 6. This slide core 8 is made movable in the direction of a vertical arrow head by the slant face of a lever 10 freely movable in the direction of a horizontal arrow head in the transverse groove 9 formed in female mold 4. A lever 10 is moved by the oil hydraulic cylinder 11 which is an external driving source.

[0016] As metal mold 2 and the cavity 6 prepared in three are shown in drawing 2 Two or more push button section 6a and connection section 6b of the shape of a frame which is arranged so that those outermost peripheries may be surrounded, and connects each push button section 6a, It consists of the space for forming closing-in connector section 6c of push button section 6a over between connection section 6b or the connection section which carries out phase opposite for each push button section 6a which it continues and is connected with the section prepared so that the surroundings might be surrounded in part.

[0017] Here, in order to clarify correspondence with the cavity 6 of metal mold,

drawing 3 explains one set of the push button unit for portable telephones by which resin shaping was carried out. that in which, as for the push button unit 21, two or more push buttons are prepared together with a longitudinal direction and a lengthwise direction -- it is -- a push button 22 (equivalent to 6a of drawing 2), and the connection section 23 (equivalent to connection section 6b of drawing 2) -- continuing -- the section 24 and some each push button 22 -- it consists of the one closing-in connector section 25 (equivalent to closing-in connector section 6c of drawing 2) extended so that the surroundings may be surrounded. The closing-in connector section 25 is the connection section 23 or a thing for continuing and tying to the section 24 in one about each push button 22, and the amount of elastic bending becomes large with this configuration. Therefore, each push button 22 is used, the connection section 23 and while it continued and had been tied with the section 24 by it.

[0018] In the above-mentioned metal mold, the runner 7 for pouring in melting resin into a cavity 6 is doing opening to connection section 6b (the projected part 26 of the connection section 23 of drawing 3 corresponds), and melting resin is poured into each push button section 6a through closing-in connector section 6c from a runner 7. This closing-in connector section 6c becomes a resin inlet to each push button section 6a. At the time of resin impregnation, it considers as the location which retreated the slide core 8 caudad, and closing-in connector section 6c as a resin inlet is taken as the inlet larger about about 3 times than the conventional usual diameter of a resin inlet.

[0019] Thereby, since resin becomes easy to flow, resin impregnation can be performed as it is also at a comparatively low pressure (low resin consistency). By moving a slide core 8 upwards after resin impregnation and within the metal mold closing time (before resin hardening), it adjusts so that a resin consistency may turn into a Sadashige Tokoro fat consistency. Thus, by carrying out resin impregnation, it can perform easily making an impregnation resin consistency into homogeneity and making it a predetermined resin consistency moreover. Consequently, the rate of an excellent article increases and the yield improves.

[0020] Moreover, it sets to the push button unit 21 formed using the above metal mold. each push button 22 -- the connection section 23 -- or -- continuing -- the section 24 -- some each push button 22, since it is tied only by one place by the closing-in connector section 25 extended so that the surroundings may be surrounded Compared with the unit of a configuration, a movable amount is conventionally large,

therefore without continuing and cutting the section 24, the connection section 23 and while it had been tied, it can be used, and a rubber sheet is less necessary like before. A cut process and an adhesion process become unnecessary by that cause, reduction of components mark and processes can be performed and low cost-ization is attained.

[0021] In addition, a figure and an alphabetic character are printed by the base or top face of each push button 22. The completed push button unit 21 is included in a case so that a base side may counter the switch inside a portable telephone.

[0022] In addition, this invention is not restricted to the configuration of the gestalt of the above-mentioned implementation, but various deformation is possible for it. For example, although the gestalt of the above-mentioned implementation showed the push button unit used for a portable telephone, it cannot be overemphasized that it can apply like other small electronic equipment.

[Brief Description of the Drawings]

[Drawing 1] The sectional view of the metal mold for fabricating the resin shaping push button unit for portable telephones concerning 1 operation gestalt of this invention.

[Drawing 2] The above-mentioned metal mold is an enlarged drawing a part.

[Drawing 3] The top view of a push button unit fabricated by the above-mentioned metal mold.

[Drawing 4] The sectional view of the conventional resin shaping metal mold.

[Drawing 5] The conventional resin shaping metal mold is an enlarged drawing a part.

[Drawing 6] The top view of a push button unit fabricated by the conventional metal mold.

[Description of Notations]

1 Metal Mold

6 Cavity

6a Push button section

6b Connection section

6c Closing-in connector section

8 Slide Core

21 Push Button Unit

22 Push Button

23 Connection Section

24 Continue and it is Section.

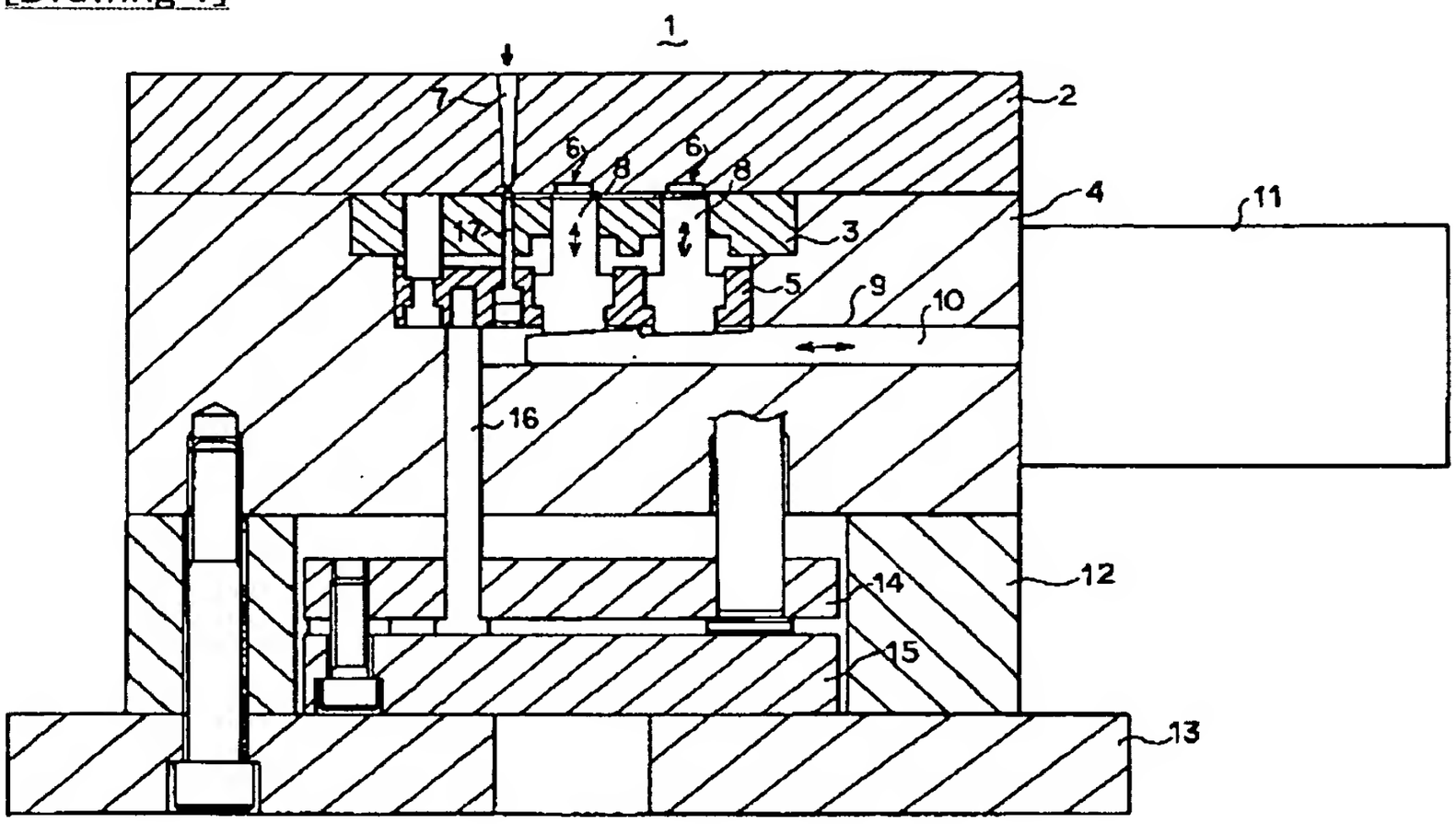
25 Closing-in Connector Section

* NOTICES *

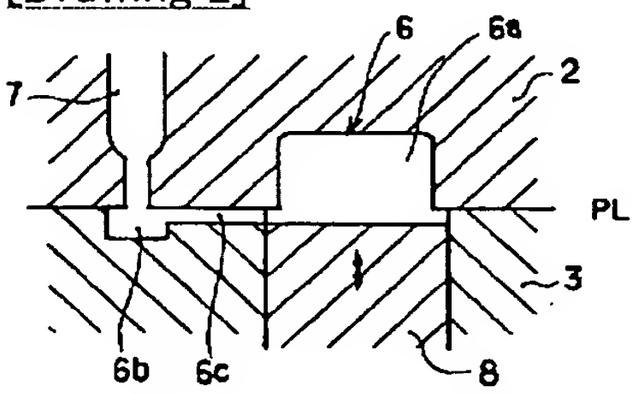
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Drawing 2]



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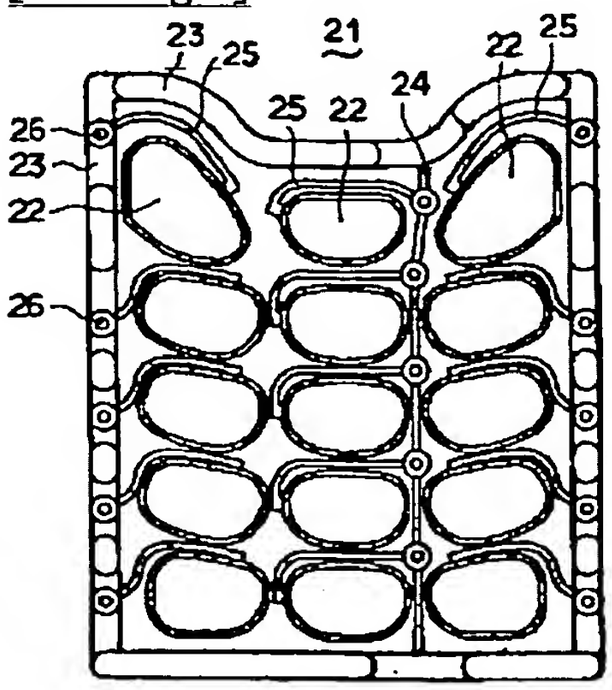

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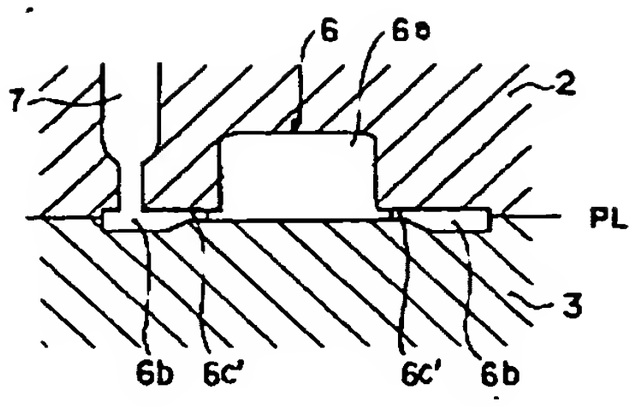

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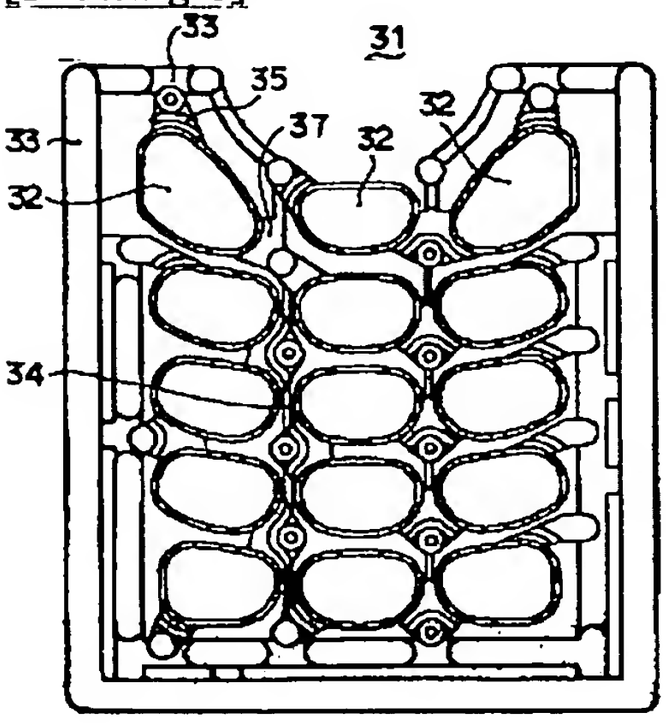
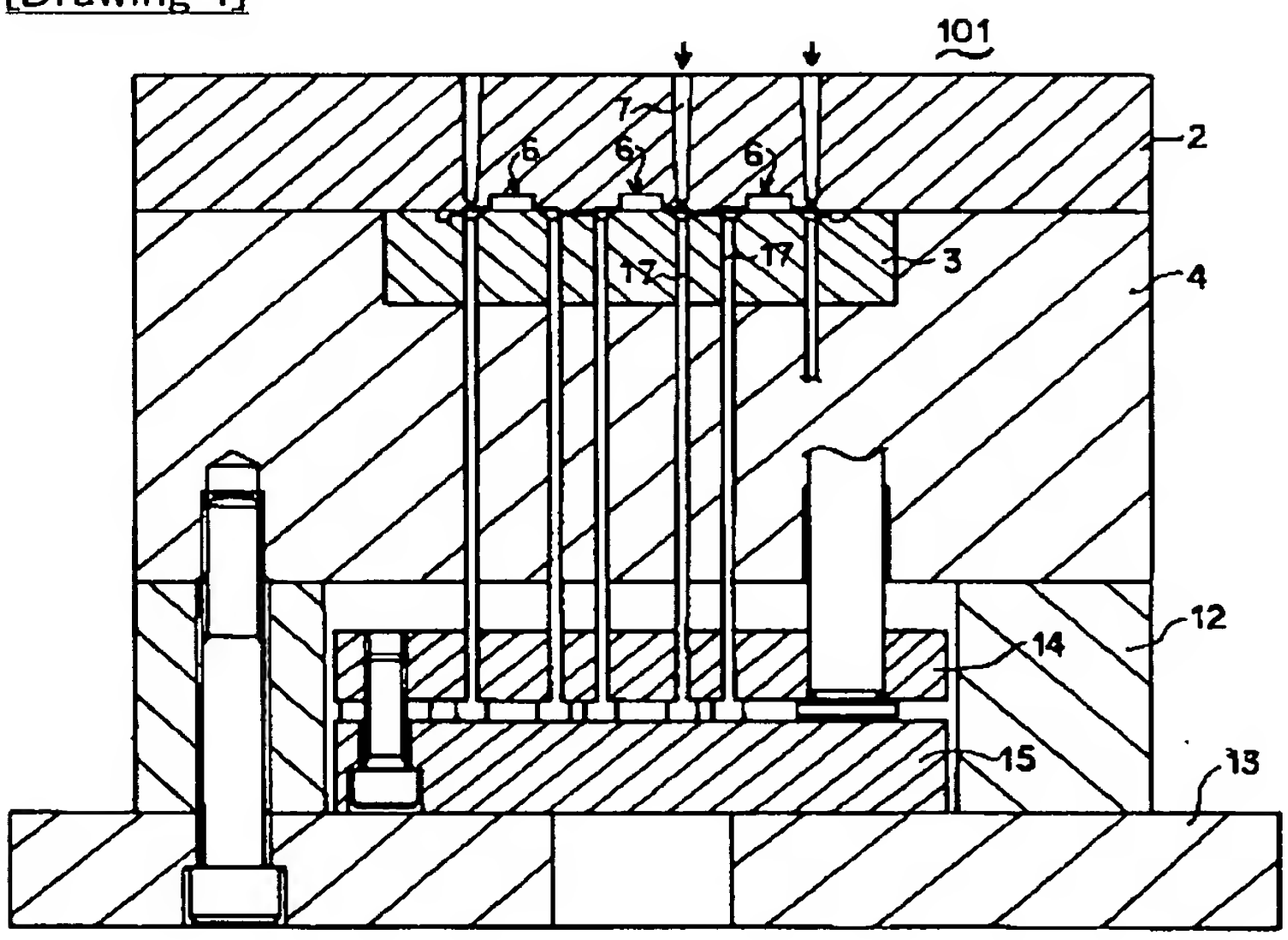


[Drawing 4]



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